CLAIMS:

1. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a passivating material over the metal doped chalcogenide comprising material; and

depositing a second conductive electrode material over the passivating material, and forming the second conductive electrode material into an electrode of the device.

2. The method of claim 1 comprising forming the second electrode material to be continuous and completely covering at least over the chalcogenide comprising material.

3. The method of claim 1 comprising forming the passivating material to be continuous and completely covering at least over the chalcogenide comprising material.

4. The method of claim 1 comprising forming the passivating material not to be continuous and not to be completely covering at least over the chalcogenide comprising material.

5. The method of claim 1 wherein the forming of the passivating material comprises exposing the substrate to ambient room temperature and pressure for at least 48 hours prior to the depositing.

6. The method of claim 1 wherein the forming of the passivating material comprises exposing the substrate to a temperature elevated from ambient room temperature prior to the depositing.

7. The method of claim 1 wherein the forming of the passivating material comprises exposing the substrate to a plasma comprising at least one of oxygen or hydrogen prior to the depositing.

8. The method of claim 1 wherein the forming of the passivating material comprises exposing the substrate to an aqueous solution prior to the depositing.

9. The method of claim 1 wherein the passivating material is formed to a thickness from 1 Angstrom to 100 Angstroms.

10. The method of claim 1 wherein the passivating material is formed to a thickness from 1 Angstrom to 50 Angstroms.

11. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

exposing the outer surface to an atmosphere having a temperature elevated from ambient room temperature for a period of time effective to form a passivating material on the metal doped chalcogenide comprising material outer surface; and

depositing a second conductive electrode material over the passivating material, and forming the second conductive electrode material into an electrode of the device.

12. The method of claim 11 comprising forming the passivating material to be continuous and completely covering at least over the chalcogenide comprising material.

13. The method of claim 11 comprising forming the passivating material not to be continuous and not to be completely covering at least over the chalcogenide comprising material.

14. The method of claim 11 wherein the atmosphere comprises oxygen.

15. The method of claim 11 wherein the atmosphere is substantially void of oxygen.

16. The method of claim 11 wherein the passivating material comprises an outer portion of the metal doped chalcogenide comprising material which is at least in part characterized by a higher concentration of "A" than metal doped chalcogenide comprising material immediately inwardly thereadjacent.

17. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

exposing the outer surface to ambient room temperature and pressure for a period of time effective to form a passivating material on the metal doped chalcogenide comprising material outer surface; and

depositing a second conductive electrode material over the passivating material, and forming the second conductive electrode material into an electrode of the device.

18. The method of claim 17 wherein the period of time is at least 48 hours.

19. The method of claim 17 wherein the period of time is at least 60 hours.

20. The method of claim 17 wherein the period of time is at least 72 hours.

21. The method of claim 17 wherein the period of time is at least 96 hours.

22. The method of claim 17 wherein the exposing comprises shielding the outer surface from ambient room light.

23. The method of claim 17 wherein the passivating material is formed to a thickness from 1 Angstrom to 100 Angstroms.

24. The method of claim 17 wherein the passivating material is formed to a thickness from 1 Angstrom to 50 Angstroms.

25. The method of claim 17 comprising forming the second electrode material to be continuous and completely covering at least over the chalcogenide comprising material.

26. The method of claim 17 comprising forming the passivating material to be continuous and completely covering at least over the chalcogenide comprising material.

27. The method of claim 17 comprising forming the passivating material not to be continuous and not to be completely covering at least over the chalcogenide comprising material.

28. The method of claim 17 wherein the passivating material comprises an outer portion of the metal doped chalcogenide comprising material which is at least in part characterized by a higher concentration of "A" than metal doped chalcogenide comprising material immediately inwardly thereadjacent.

29. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

exposing the outer surface to a plasma comprising at least one of oxygen or hydrogen effective to form a passivating material on the metal doped chalcogenide comprising material outer surface; and

depositing a second conductive electrode material over the passivating material, and forming the second conductive electrode material into an electrode of the device.

30. The method of claim 29 wherein the plasma comprises oxygen.

31. The method of claim 30 wherein the plasma is derived from a gas comprising O_2.

32. The method of claim 29 wherein the plasma is derived from a gas comprising H_2.

33. The method of claim 29 comprising forming the second electrode material to be continuous and completely covering at least over the chalcogenide comprising material.

34. The method of claim 29 wherein the passivating material comprises an outer portion of the metal doped chalcogenide comprising material which is at least in part characterized by a higher concentration of "A" than metal doped chalcogenide comprising material immediately inwardly thereadjacent.

35. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

exposing the outer surface to an aqueous solution effective to form a passivating material on the metal doped chalcogenide comprising material outer surface; and

depositing a second conductive electrode material over the passivating material, and forming the second conductive electrode material into an electrode of the device.

36. The method of claim 35 wherein the aqueous solution consists essentially of H_2O.

37. The method of claim 35 wherein the aqueous solution during the exposing is maintained at a temperature of from about 15°C to about 100°C.

38. The method of claim 35 wherein the aqueous solution consists essentially of H_2O, the aqueous solution during the exposing is maintained at a temperature of from about 15°C to about 100°C, and the aqueous solution during the exposing is maintained at room ambient pressure.

39. The method of claim 35 comprising forming the second electrode material to be continuous and completely covering at least over the chalcogenide comprising material.

40. The method of claim 35 wherein the passivating material comprises an outer portion of the metal doped chalcogenide comprising material which is at least in part characterized by a higher concentration of "A" than metal doped chalcogenide comprising material immediately inwardly thereadjacent.

41. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

oxidizing the metal doped chalcogenide electrode material outer surface effective to form a layer comprising at least one of an oxide of "A" or an oxide of "B"; and

after the oxidizing, depositing a second conductive electrode material over the layer comprising at least one of the oxide of "A" or the oxide of "B", and forming the second conductive electrode material into an electrode of the device.

42. The method of claim 41 wherein the layer comprises an oxide of "A".

43. The method of claim 41 wherein the layer comprises an oxide of "B".

44. The method of claim 41 wherein the layer comprises an oxide of "A" and an oxide of "B".

45. The method of claim 41 comprising depositing the second conductive electrode material on the layer.

46. The method of claim 41 wherein the oxidizing is effective to form the layer to be dielectric.

47. The method of claim 41 wherein the oxidizing is effective to form the layer to have a thickness of less than or equal to 50 Angstroms.

48. The method of claim 41 wherein the oxidizing is effective to form the layer to be dielectric and to have a thickness of less than or equal to 50 Angstroms.

49. The method of claim 41 wherein the oxidizing comprises exposure to HNO_3.

50. The method of claim 41 wherein the oxidizing comprises exposure to an HNO_3 solution.

51. The method of claim 41 wherein the oxidizing comprises exposure to a fluid consisting essentially of H_2O.

52. The method of claim 41 wherein the oxidizing comprises exposure to H_2O_2.

53. The method of claim 41 wherein the oxidizing comprises exposure to O_2.

54. The method of claim 41 wherein the oxidizing comprises exposure to O_3.

55. The method of claim 41 comprising forming the non-volatile resistance variable device into a programmable memory cell of memory circuitry.

56. The method of claim 41 wherein the first and second conductive electrode materials are different.

57. The method of claim 41 comprising forming the second electrode material to be continuous and completely covering at least over the chalcogenide comprising material.

58. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a metal doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising the metal and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the metal doped chalcogenide electrode material having an outer surface;

exposing the outer surface to an HNO_3 solution; and

after the exposing, depositing a second conductive electrode material over the chalcogenide comprising material, and forming the second conductive electrode material into an electrode of the device.

59. The method of claim 58 wherein the exposing is effective to form a layer comprising at least one of an oxide of "A" or an oxide of "B" on the metal doped chalcogenide electrode material outer surface.

60. The method of claim 58 wherein the exposing is effective to form a passivating material comprising an outer portion of the metal doped chalcogenide comprising material which is at least in part characterized by a higher concentration of "A" than metal doped chalcogenide comprising material immediately inwardly thereadjacent.

61. The method of claim 58 wherein "A" comprises Ge.

62. The method of claim 58 wherein "A" comprises Ge, and "B" comprises Se.

63. The method of claim 58 wherein the metal comprises Ag.

64. The method of claim 58 wherein "A" comprises Ge, "B" comprises Se, and the metal comprises Ag.

65. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming a silver doped chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising silver and A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table, the silver doped chalcogenide electrode material having an outer surface;

oxidizing the silver doped chalcogenide electrode material outer surface effective to form a dielectric layer comprising at least one of an oxide of "A" or an oxide of "B", the dielectric layer being no greater than 50 Angstroms thick; and

after the oxidizing, depositing a second conductive electrode material over the dielectric layer, and forming the second conductive electrode material into an electrode of the device.

66. The method of claim 65 wherein "A" comprises Ge.

67. The method of claim 65 wherein "A" comprises Ge, and "B" comprises Se.

68. The method of claim 65 wherein the second electrode material predominately comprises elemental silver.

69. The method of claim 65 wherein the oxidizing comprises exposure to HNO_3.

70. The method of claim 65 wherein the oxidizing comprises exposure to an HNO_3 solution.

71. The method of claim 65 wherein the oxidizing comprises exposure to a fluid consisting essentially of H_2O.

72. The method of claim 65 wherein the oxidizing comprises exposure to H_2O_2.

73. The method of claim 65 wherein the oxidizing comprises exposure to O_2.

74. The method of claim 65 wherein the oxidizing comprises exposure to O_3.

75. The method of claim 65 comprising depositing the second conductive electrode material on the dielectric layer.

76. The method of claim 65 wherein the layer comprises an oxide of "A".

77. The method of claim 65 wherein the layer comprises an oxide of "B".

78. The method of claim 65 wherein the layer comprises an oxide of "A" and an oxide of "B".

79. A method of forming a non-volatile resistance variable device, comprising:

forming a first conductive electrode material on a substrate;

forming chalcogenide comprising material over the first conductive electrode material, the chalcogenide material comprising A_xB_y, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a metal comprising layer over the chalcogenide comprising material;

irradiating the metal effective to break a chalcogenide bond of the chalcogenide material at an interface of the metal and chalcogenide material and diffuse at least some of the metal into the chalcogenide comprising material, and forming an outer surface of the chalcogenide comprising material;

after the irradiating, oxidizing the metal doped chalcogenide electrode material outer surface effective to form a dielectric layer comprising at least one of an oxide of "A" or an oxide of "B", the dielectric layer being no greater than 50 Angstroms thick; and

after the oxidizing, depositing a second conductive electrode material over the chalcogenide comprising material, and which is continuous and completely covering at least over the chalcogenide comprising material, and forming the second conductive electrode material into an electrode of the device.

80. The method of claim 79 wherein the oxidizing comprises exposure to HNO_3.

81. The method of claim 79 wherein the oxidizing comprises exposure to an HNO_3 solution.

82. The method of claim 79 wherein the oxidizing comprises exposure to a fluid consisting essentially of H_2O.

83. The method of claim 79 wherein the oxidizing comprises exposure to H_2O_2.

84. The method of claim 79 wherein the oxidizing comprises exposure to O_2.

85. The method of claim 79 wherein the oxidizing comprises exposure to O_3.

86. The method of claim 79 wherein "A" comprises Ge.

87. The method of claim 79 wherein "A" comprises Ge, and "B" comprises Se.

88. The method of claim 79 wherein the metal comprises Ag.

89. The method of claim 79 wherein "A" comprises Ge, "B" comprises Se, and the metal comprises Ag.